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cometary appendage than one of the usual faculæ which surround the central area of depression.

The Solar Prominences. By Father Secchi.

(*From the Comptes Rendus.* Abstract.)

" I have the honour of presenting to the Academy the result of all my observations made on the Prominences during the year 1871. I think it indispensable to present this summary, for it demonstrates that the conclusions, announced after the first observations, are confirmed by a sufficiently long period, comprising nine solar rotations. New facts also are made manifest, which bear importantly on the solar theory. The nine synodic rotations (approximate), and the number of days of effective observations, were distributed as follows :—

Rotation.		Days of observation.
I.	April 23rd to May 21st	25
II.	May 22nd to June 18th	24
III.	June 19th to July 15th	26
IV.	July 16th to August 12th	28
V.	August 13th to September 9th	25
VI.	September 10th to October 7th	18
VII.	October 8th to November 9th	14
VIII.	November 5th to December 4th	8
IX.	December 5th to December 31st	16

" The total number of prominences noted and figured amounts to 2667; the total number of days of complete observation is 184.

" The following table* contains the number of observed prominences arranged in bands of heliographic latitude ten degrees wide :—

	Number of Prominences.	
	Northern Hemisphere.	Southern Hemisphere.
90° to 80°	118	139
80 ,, 70	142	180
70 ,, 60	73	87
60 ,, 50	87	61
50 ,, 40	125	156
40 ,, 30	182	183

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* In the original paper the numbers are given in all the tables for each rotation. The tables so arranged would not be suited to these pages. Moreover, none of the results dwelt on by Secchi as depending on latitude, require the evidence of individual rotations. He considers the results for the whole Sun, with reference to the different rotations; and the necessary evidence for this purpose is here presented separately.

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			Number of Prominences.	
			Northern Hemisphere.	Southern Hemisphere.
30	,,	20	203	223
20	,,	10	195	228
10	,,	0	183	202
		Sums	1208 N.	1459 S.
Total			2667	
Mean number per day				14·49

"We see that there are two principal maxima of frequency placed between 20 and 30 degrees of north latitude, and between 10 and 30 degrees of south latitude; two secondary maxima are found between 70 and 80 degrees in each hemisphere. The principal minima fall between 60 and 70 degrees north and 50 and 60 degrees south; one secondary minimum near the equator, between zero and 10 degrees north; and two other minima at the poles. In successive rotations, there is no trace of a progressive motion of the principal maximum towards the poles as had been suspected; if there is any small oscillation or displacement the phenomenon lasts but a short time; we shall see in future times whether this will be confirmed. The mean numbers of prominences per day of observation were as follows, for the rotations numbered I. to IX. above:—14·24; 16·12; 14·85; 15·78; 14·96; 14·61; 14·28; 13·75; 15·56; showing that the number of prominences reached a maximum between May and June, and a minimum between September and November. These variations correspond with the solar activity as deduced from the frequency of spots.

"But, to judge of the solar activity, the number of prominences is not enough; we must consider their height. For this purpose the following table has been prepared. It shows the mean height of all the observed prominences, this height being expressed in terms of an arbitrary unit, convenient for the observations, and corresponding to eight seconds (for convenience in drawing):—

			Mean Height of Prominences.	
			Northern.	Southern.
90°	to	80°	5·08	5·45
80	,,	70	5·28	5·77
70	,,	60	4·27	4·73
60	,,	50	5·25	4·69
50	,,	40	5·81	5·93
40	,,	30	6·69	7·03
30	,,	20	6·32	6·92
20	,,	10	5·62	6·07
10	,,	0	5·90	6·00
		Mean	5·66	5·90
Absolute mean			5·78	

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"This table proves that the regions where the prominences are most numerous are those also where they are most lofty. The mean height diminishes from the second to the eighth rotation, or from May 22nd to December 4th, when it was reduced in the proportion of 4 to 7. (After this rotation it appeared to increase again.*) In the southern hemisphere the prominences are somewhat higher, as well as more numerous, than in the northern.

"The better to evaluate this interesting element, the following table has been prepared. It shows the number of prominences having a height exceeding 40 seconds, and the number exceeding 60 seconds in height:—

	Number of Prominences 40″ high and upwards.		Number of Prominences 60″ high and upwards.	
	Northern.	Southern.	Northern.	Southern.
90° to 80°	77	92	18	23
80 " 70	110	148	33	43
70 " 60	41	53	14	19
60 " 50	52	33	26	7
50 " 40	77	115	36	39
40 " 30	134	140	65	67
30 " 20	154	169	65	71
20 " 10	132	175	40	69
10 " 0	138	130	44	61
Sums	925	1039	343	408
Total	1964		751	
Mean number per day	10·67		3·22	

"It follows that the positions of the maxima and minima are nearly identical with those shown in the general table; and the secondary maximum, near the polar zone, remains very well marked. The total numbers observed during the rotations were as follows:—

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.
Prominences above 40″	211	334	342	360	297	150	96	54	120
Prominences above 60″	100	142	164	132	107	34	25	10	37

"We see that after the fifth rotation there is a marked falling off in prominences of both orders.† This particular state of things corresponds visibly with the number of spots, which diminished greatly after September 10. The solar diameters also, as determined by the chronograph, showed greater regularity during this period of solar tranquillity.

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* Or rather, perhaps, the diminution was too irregular to be properly indicated in periods of single rotation, as appears from the following numbers, giving the mean height for the nine rotations:—6·26, 7·38, 7·12, 6·25, 6·17, 5·04, 4·96, 4·05, 4·81.

† It will be remembered that the first order includes the second.

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"In the following table the extent of the prominences in solar latitude is indicated, as well as the frequency of faculæ:—

	Mean width of Prominences.		Number of Faculæ.	
	Northern.	Southern.	Northern.	Southern.
90° to 80°	5·02	5·12	61	61
80 ,, 70	5·82	5·56	75	94
70 ,, 60	4·49	5·05	83	106
60 ,, 50	5·10	5·51	95	100
50 ,, 40	5·68	5·37	150	142
40 ,, 30	5·99	6·01	223	231
30 ,, 20	6·12	5·83	295	317
20 ,, 10	6·06	6·03	280	315
10 ,, 0	5·81	5·66	170	192
Mean	5·57	5·58	Sums 1432	1558
Absolute mean	5·575		Total 2990	

"We see that the regions which furnish the maximum numbers* are those also in which the prominences have their greatest extension. In successive rotations, diminished height corresponds to diminished width, as appears from the following mean widths for the nine successive rotations:—6·22, 5·65, 6·52, 5·48, 5·45, 4·75, 4·93, 4·87, 6·30.†

"The parallelism between height and width cannot be pursued further, for often a great extent of chromosphere is very high and very bright; but it does not reach higher than 24 seconds, the limit conventionally assigned to characterise a prominence. Be this as it may, however, we find that the prominence-masses which are highest are also those which have the greatest extent in longitude and latitude, though we meet sometimes with narrow and isolated prominences reaching to a great height.

"The classification of the positions of faculæ shows (1) that the regions richest in faculæ coincide with the regions already indicated where the prominences have their maximum height and width; (2) that the faculæ have a secondary minimum at the equator; and that beyond the maxima placed between 10 and 30 degrees, they decrease regularly up to the poles; but yet (3) that near the poles there are regions where rather bright granulations reach near to the border, and counting these we should find a secondary maximum of faculæ on the borders of the polar zones; but the limits are very difficult to observe, and have not always been taken into account.

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[*] The text has been departed from here Secchi writes:—"Les régions qui fournissent des maxima *et des minima* pour le nombre des protubérances sont aussi celles dans lesquelles les protubérances sont le plus étendues." The italicised words should obviously be omitted.

[†] Secchi does not sum up the number of faculæ in the different rotations, but their agreement with the prominences in this respect is close and significant, the faculæ being always most numerous when the prominences are so, and *vice versâ*.

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"Among the 893 prominences observed between August 26th and December 31st, 471 were found to have a well-marked slope, resembling inclined plumes; of these, 370 were inclined in agreement with the law of movement of the solar atmosphere, from the equator towards the poles, and only 101 were sloped in the contrary direction; 40 were vertical, at the poles and equator. Comparing this result with that mentioned in former communications, we see that it cannot be accidental. I see that M. Spörer has arrived at the same result, later. I may remark here that during the epochs of greatest activity the law is more constant and decided."

Observations of the Planet (117) *Lomia, made at the Marseilles Observatory.* By MM. Stéphan and Borrelly.

Date of the Obser.	Hour of the Observation Marseilles Mean Time.	Apparent R.A. of (117)	Log. f. Par.	Apparent Decl. (117)	Log. f. Par.	Observer.	Comparison Star.
1871.	d h m s	h m s		° ′ ″			
Sept.	12 10 47 12	23 49 6·25	+1·2477	+1 18 16·5	0·7759	B.	*a*
	12 12 46 28	23 49 1·57	2·3885	1 18 11·1	0·7722	S.	*a*
	13 9 45 41	23 48 14·47	1·4301	1 17 34·9	0·7772	B.	*a*
	15 9 0 39	23 46 27·08	$\bar{1}$·5025	1 15 49·8	0·7783	B.	*f*
	15 11 10 12	23 46 21·88	$\bar{1}$·0367	1 15 43·2	0·7753	S.	*b*
	16 8 18 47	23 45 33·44	1·5582	1 14 53·6	0·7800	B.	*a*
	18 10 11 1	23 43 36·39	1·2762	1 13 54·6	0·7763	S.	*b*
	19 12 42 37	23 42 37·95	$\bar{2}$·9981	1 11 46·4	0·7762	S.	*c*
	22 13 23 54	23 39 51·41	1·3027	1 8 38·7	0·7773	S.	*c*
	29 21 36 32	23 33 41·13	2·8327	1 1 23·9	0·7775	S.	*d*
	30 12 45 43	23 32 47·21	1·3027	1 0 18·2	0·7783	S.	*d*
Oct.	15 12 12 57	23 21 35·54	1·4107	+0 48 27·9	0·7805	S.	*e*

Adopted Mean Positions of the Comparison Stars, for 1871·0.

	Names of the Comparison Stars.	R.A.	Decl.	Magnitude.
		h m s	° ′ ″	
a	25 Poissons 8303 B.A.C.	23 46 28·26	+1 22 26·7	6·5
b	869 Weisse, hora 23	23 43 31·95	+1 15 14·1	9·0
c	4779 Arg. Z. + 1°	23 43 22·10	+1 10 49·8	9·3
d	8243 B.A.C.	23 35 28·27	+1 4 20·0	5·0
e	5007 Arg. Z. + 0°	23 23 5·68	+0 54 56·8	9·4
f	874 Weisse, hora 23	23 43 45·43	+1 12 7·3	9·0